

Amended
wherein the peel strength between said adjacent fibrous layers is at least about 3.0 lbs. as determined by the peel resistance test of ASTM-D-1876-72.

Claim 2, at line 4, substitute ---j/g--- for "J/g".

Claim ~~6~~, at line 5, insert ---40--- between "about" and "j/g".

REMARKS

Claims are amended in response to the rejection of claims 2 and 6 under 35 U.S.C. § 112, second paragraph, and to claim more preferred embodiments of the invention. There is clear antecedent basis for this amendment in the originally filed application. See for example, lines 7 to 12 of page 6 and lines 23 to 31 of page 33 of the specification. This amendment does not introduce new matter and should be entered accordingly.

This amendment also obviates all basis for the rejection of claims under Section 112. Accordingly, the rejection should be withdrawn.

Claims 1 to 27 are rejected under 35 U.S.C. § 103 as being unpatentable over U.S. Patent No. 4,916,000 ("Li et al.") in view of U.S. Patent No. 4,897,770 ("Dunbar") and U.S. Patent No. 4,873,116 ("Ancker et al"). These rejections are respectfully traversed.

The present invention is directed to an impact resistant composite which comprises two or more layers. At least two of the layers are adjacent fibrous layers comprised of fibers in a matrix comprising one or more thermoplastic resins, one or more thermosetting resins and an effective amount of an initiating/compatibilizing agent. Surprisingly, applicants have discovered that the combination of matrix formed from thermosetting resins and thermoplastic polymer and the effective amount of a special agent which includes functionalities that initiate curing of the thermosetting resin and functionalities which are compatible with the thermoplastic enhance peel strength between the adjacent layers. The advantages of this invention are clear from Example I, at pages 34 to 36 and Table II, at page 36 of the specification. It is applicants' opinion that this invention and the advantages attendant thereto are not taught suggested by the cited references.

Examiner has combined three references to frame this rejection. This in and of itself suggests the non-obvious of the claimed invention.

Li et al, the primary reference, is directed to an improved composite comprised of one or more layers of a network of filaments in a matrix where the ratio of the thickness of at least one layer to the equivalent diameter of the filaments in that layer is less than a certain value. In Examiner's opinion, Li et al does specifically disclose matrices that can be thermoplastic or thermosetting, but does not specifically disclose mixtures of thermoplastic and thermosetting resins as the matrix. Applicants are in agreement with this position. It is also apparent that Li et al does not teach or suggest the presence of the initiating/compatibilizing agent in the mixture of thermoplastic and thermosetting resins and the effect of same on the beneficial properties of the composite.

It is clearly Examiner's opinion that Li et al is not sufficient to anticipate or render the claimed invention obvious. Accordingly, Examiner has combined Li et al with two secondary references, Dunbar or Anker. It is Examiner's opinion that Dunbar, one secondary reference, discloses "matrices formed of thermoplastic resins" and obviates one deficiency of Li et al, and that Anker, the other secondary reference, discloses using a compatibilizing system, and thus obviates the other deficiency of Li et al. Applicants do not agree with this assessment of the situation.

Dunbar relates to a process for producing prefomable continuous strand mats using a mixture of thermosetting and thermoplastic resins. As disclosed at col. 1, lines 59 and 60 of Dunbar, a binder matrix material of powdered thermosetting resin and thermoplastic resin is applied to a continuous strand mat should using a traditional powder applicator. At col. 2, lines 10 to 17, Dunbar states that the mat containing the binder matrix material is heated, which cures and hardens the thermosetting portion of the binder material which apparent fixes the mat place. The heating also causes the thermoplastic material to soften and flow around the strand intersections, apparently leaving the cured and hardened thermoset in another place. It is readily apparent that the binder matrix material used in Dunbar is not the same as in the present

invention. The present invention uses these materials in a blend, while in Dunbar they are apparently not in a blend. Indeed, if a blend was used in the Dunbar process and performable mats, it would be difficult for the thermoplastic component to flow from the cured hardened thermosetting component to the strand intersections. Moreover, the use of the initiating/compatibilizing agent of this invention in the application of Dunbar would make such flowing even more difficult because of the enhanced compatibilization between the two resins.

Ancker is directed to a method of preparing mixtures of incompatible hydrocarbon polymers through use of a "novel compatibilizing system" (See col. 1, lines 7 to 10 of Ancker. At col. 5, lines 9 and 10, Ancker indicates that hydrocarbon polymers are thermoplastic. Thus, one distinct between this reference and the claimed invention is the nature of the resins. It is well known in the art that thermoplastic resins and thermosetting resins are different. Thus, what is true of a blend or mixture of thermoplastic resins may not be and, indeed, is probably not true of a blend or mixture of thermoplastic and thermosetting resins.

Another distinction between the present invention and the disclosure of Ancker is the compatibilizing system. In Ancker, the compatibilizing system is a mineral filler and certain reinforcement additives and is apparently designed to benefit thermoplastic resins. This system is very different from the initiating/compatibilizing system used in the present invention, which is designed to function with a blend of thermoplastic and thermosetting resins. The Ancker system, and the claimed system operate on different concepts and with different materials. The fact that such system can function as a compatibilizer in one polymer blend, in no way teaches or suggests that the system or any other system can function in a blend of totally different polymers.

It is applicants' position that the art of record does not suggest the claimed invention such that such invention is prima facie obvious. The court has succinctly defined the inquiry it undertakes in evaluating alleged prima facie obviousness. The court has indicated that cited references must provide

sufficient motivation for one of ordinary skill in the art to modify the prior art process with a reasonable expectation that the invention as claimed would result. (See In re Lintner, 173 USPQ 560 (CPA 1972), In re Stemniski, 444 F2d 581, 170 USPQ 343 (CCPA, 1971) and In re Clinton, 527 F2d 1226, 188 USPQ 365 (CCPA 1976). The linch pin of the analysis is motivation with reasonable expectation of success in achieving the results of the invention.

Where the prior art itself provides no apparent basis for concluding that a person of ordinary skill in the art would be motivated to pick and choose bits and pieces from various references so as to arrive at the claimed invention with a reasonable expectation of success there is no prima facie obviousness. During this consideration, all of the claim limitations must be considered. In re Kuehl, 177 USPQ 250 (CCPA 1973). Where the art of record contains no teaching or suggestion of the cause and effect relationship discovered by the applicant, the invention is not prima facie obviousness. In re Antonie, 195 USPQ 6 (CCPA 1477).

When employing the prescribed methodology for assessing obviousness it is readily apparent that the claimed invention is not prima facie obvious. The record (patent specification) clearly shows that there is a cause and effect relationship between the use of the mixture of thermoplastic and thermosetting resins and the initiating/compatibilizing agent and the advantages of the invention. The cited references are completely silent with regard to the cause and effect relationship discovered by applicants and of the specific features of the claimed invention necessary to provide the benefit. Moreover, these references are completely silent as to how one of ordinary skill in the art would go about picking the critical features which would provide the beneficial results from among the plethora of possibilities. There is absolutely no art of record in this case which would motivate one of ordinary skill in the art to do what applicants have done. In fact, the art of record is "demotivating". It is well settled law that references can be combined to frame a Section 103 rejection, but they cannot be combined indiscriminately. In re Mercier, 515 F2d 1161,

185 USPQ 774 (CCPA 1982). As the Court stated in In re Sterniski, 444 F 2d.581, 170 USPQ 343 (CCPA 1971).

"there must be some logical reason apparent from positive, concrete evidence of record which justifies a combination of primary and secondary references and subsequent conclusion of obviousness"

No such "logical reason" has been presented nor is any set forth in the references themselves. Examiner has taken bits and pieces from various references and combined these disclosures to hypothetically create an embodiment which does not even include all of the critical features of the claimed invention i.e. initiating/compatibilizing agent. Why would one of ordinary skill in the art use a blend of a thomaplastic and a thermosetting resin for the matrix based on the teachings of Dunbar where the invention of Dunbar requires that the themoplastic and thermosetting resin aggregate in different areas? Based on the teachings of Dunbar why would one of skill in the art use an initiating/compatibilizing agent in the blend or combine the teaching of Dunbar and Ancker when use of such agents would prevent or retard the aggregation required by the Dunbar invention? Even if one of ordinary skill in the art would combine Li et al, Dunbar and Ancker or suggested by Examiner where is the art which teaches or suggests that the compatibilizer of Ancker for compatibilizing mixtures of thermoplastic resins must also be further modified to form an initiating/compatibilizing agent which is capable of initiating the curing of a thermoplastic resin and which is also capable of compatibitizing the blending of the thermoplastic resin and thermosetting resin?

The requisite motivation with a reasonable expectation of success is clearly not present in this case. There is absolutely no art of record which would motivate one of ordinary skill in the art to do what applicants have done. This rejection is clearly predicated on obvious-to-try, and hindsight reliance on the teachings of applicants' application. That is, since various references may

disclose treating use of thermosetting or thermoplastic resins and the use of compatibilizers with various other resins and the use of compatibilizers with various other resins, one of ordinary skill in the art would be motivated to try all possible combinations of resins and compatibilizers not taught in the references such that at some point in time this individual of ordinary skill in the art would select the combinations which would provide the results of this invention, despite the fact that the cited references contain no teaching or suggestion of a cause and effect relationship between the combination of resins and initiating/compatibilizing agents and the advantages of this invention. Hindsight and obvious-to-try are not the appropriate standards of review. The courts have clearly held that the appropriate standard is obvious to do based on reasonable motivation from the references and not obvious to try. In re Antonie, 195 USPQ 6 (CCPA 1977) and In re Tomlinson et al., 363 F2d 928, 150 USPQ 623 (CCPA 1966).

These rejections are inappropriate and should be reversed.

Respectfully Submitted,
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By



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